

REMARKSClaim Objections

Claims 66-82 have been cancelled without prejudice and substituted by new claims 83-100.

The independent claim of the new set of claims is the process claim 83 (former claim 66 slightly redrafted as explained in the paragraph "Claims rejections under 35 USC§ 112" and restricted as explained in the paragraph "Claims rejections under 35 USC§102 Novelty").

Claim 84 is former claim 67 slightly redrafted as explained in the paragraph "Claims rejections under 35 USC§112".

New claim 85 is based on the specification as filed as explained in the paragraph "Claims rejections under 35 USC§112". Furthermore, the range "from 4 to 10%" can be found on page 14 lines 6 - 7 ("between 4 and 10%"), and the values of 4% and 10% can be found in the examples (EXAMPLE 1 from page 9 line 30 to page 12 line 32 : "4%" for test A1 on page 10 lines 29 - 30 ; "4%" for test D1 on page 11 lines 18 - 19 ; EXAMPLE 2 from page 13 line 1 to page 15 line 27 : "10%" on page 13 lines 12 and 19).

Claims 86 to 100 are former claims 68 to 82.

Claims rejections under 35 USC§112

Former claims 66 - 82 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

This rejection is respectfully traversed.

Former claim 66, which has been amended into new claim 83, was referring to a "mass" and based on the specification on page 1 lines 27 to 33: "including any internal treatment according to which said composition (a composition comprising at least one cationic starch material and at least one sulfonated starch material) is totally or mainly distributed throughout the mass constituting the resulting plane structure". The word "mass" is connected with the bulk or body of the plane structure. Nevertheless, this term no longer appears in new claims 83, 84 and 85: "the mass constituting the" has been amended to "the" in claims 83, 84 and 85.

It is respectfully submitted that the invention as claimed now fulfills the requirements of 35 USC§112 §2.

Claims rejections under 35 USC§ 102 Novelty

Former claims 66-82 have been rejected in the Office Action under 35USC§102(b) as anticipated by MALICZYSZYN (4,872,951). By the present amendment, claims 66-82 have been withdrawn from examination without prejudice and have been replaced by claims 83 to 100. Claims 83-100 are pending.

This rejection is respectfully traversed in view of the new submitted set of claims, in which new claim 83 has been restricted only to "internal treatment of plane structures".

The MALICZYSZYN document (4,872,951) discloses a blend of starches used for external sizing of paper or paperboard. The blend of starches includes a cationic starch and various anionic starches among them a sulfonated anionic starch. Example 2 of the MALICZYSZYN document deals with the embodiment of blends comprised of a cationic starch and an anionic starch, which is sulfonated: see column 8, line 19 "3-chloro-2-sulfopropionic acid

(CSPA)", and table II last lines (two different blends).

However, the MALICZYSZYN document deals only with "external sizing" that is to say an "external treatment" of paper and paperboard. It is clearly stated in this document that such an external sizing is different from an internal treatment:

"When sizing materials are applied to the surface of a web or a sheet in order to cement the surface fibers of the paper and to modify the sheet surface, the process is known as external or surface sizing; the latter process being quite distinct from an internal sizing process where sizing agents are admixed with the pulp slurry prior to its being converted into web or sheet form, to reduce penetration of aqueous or other fluid into the paper."

(Column 1 lines 12 to 21; underline added)

Hence the invention as claimed is novel versus the MALICZYSZYN document (4,872,951).

It is to be noted that the other cited MALICZYSZYN document (6,413,372), which is not discussed by the Examiner, deals only with blends of cationic starch and starch phosphate. Thus the blends of anionic starches and cationic starches disclosed in this very document are such that the anionic starches are only phosphate containing starches. This document deals with internal treatment of papers:

"This invention involves the process of making paper comprising adding to the paper stock or furnish prior to or during formation of the sheet, a combination of cationic starch and starch phosphate, the combination having a zeta potential of from about +20 to -18mV (millivolts)." (see column 2 lines 12 to 17 of this very document; underline added)

Hence the invention as claimed is also novel versus the other MALICZYSZYN document (6,413,372).

Furthermore, the process of the invention as disclosed in the present specification is particularly useful for internal treatment, because, surprisingly and unexpectedly, it obviates the need carrying out all or part of the external treatment applied to a paper manufactured according to such a process:

"It is thus possible to envisage dispensing with all or part of any surface treatment applied in the prior art to achieve physical properties of the same order.

Another approach consists of increasing the level of inorganic fillers in the paper at the expense of fibers (more costly raw material than fillers) and of compensating for the resulting reduction in the physical properties of the paper by a supplementary addition of starches, made possible by using the composition according to the invention." (Page 14 lines 8 to 14; underline added)

"This confirms the value of compositions according to the invention within the aim of totally or partially dispensing with devices of the "size press" type." (Page 15 lines 26 and 27; underline added)

Furthermore, such an external treatment has some disadvantages:

"However, this surface treatment operation incurs excess costs associated with the equipment and supplementary drying operation which it involves as well as a very large reduction (generally 15 to 25 %) in machine speeds and therefore of their productivity." (Page 3 lines 27 to 30)

Thus the process according to the invention as claimed is surprisingly advantageous versus the process disclosed in the MALICZYSZYN document (4,872,951).

Furthermore, it is to be noted that in the MALICZYSZYN document (4,872,951) the exemplified sulfonated anionic starch gives the worst result among the tested anionic starches. In fact, the lowest values of the Gurley density are obtained with tests on the blend with CSPA treated starch as anionic starch (see Table II of this very document, column 8: values from 10 to 14 whereas the other tested compounds give values in the range from 12 to 70 (with anionic starch treated with STP = sodium tripolyphosphate) or within the range from 15 to 322 (with anionic starch treated with CMPA = N-(2-chloroethyl)imino-bis-(methylene diphosphonic acid)). The "Gurley density" test is a measure of the air resistance or porosity of a sized paper sheet. Higher values of Gurley density are correlated to less porous papers as explained in this document (column 6 lines 14 to 28).

Then the person skilled in the art, reading the MALICZYSZYN document, would never think of using a compound which provides the worst results (as explained above) for external treatment; rather, the person skilled in the art would use a better compound, such as OSA treated ASA-starch (see example 1 of this very document, from column 6 line 36 to column 7 line 24 : ASA is a Alkyl or alkenyl succinic anhydride, preferable ASA is 1-octenyl succinic anhydride or OSA). Thus this document teaches away from the use of sulfonated anionic starch and hence, **the present invention is unobvious versus said document.**

On the contrary, the invention deals with the use of a blend of cationic starch and sulfonated starch, and "such a starch (i.e. sulfonated starch), for example a starch monosulfosuccinate, associated in a mixture with a cationic starch, enables papermaking performances to be achieved which are better than those observed under the same conditions with other

anionic starches such as a non-sulfonated carboxylated starch or a phosphated starch." (see page 6 lines 13 to 17). It has been proved within the specification, and particularly in EXAMPLE 1 , that this starch provides better results than as a non-sulfonated carboxylated starch or a phosphated starch. Some comparative tests have shown the efficiency of the compounds according to the invention: see in the Table on page 12 the AR and TR values in % of the tests A1 and D1 (respectively A2 and D2, A3 and D3) according to the invention versus the comparative tests B1 and C1 (respectively B2 and C2, B3 and C3). For example the AR values of A1 and D1 are of 100% whereas the AR values of B1 and C1 are of 96% and 92%, and the TR values of A1 and D1 are of around 89% whereas the TR values of B1 and C1 are of around 87%.

Such data within the specification have proved that:

"It is noteworthy that the advantages provided by the compositions according to the invention (improvement of the indices AR and TR and of the internal cohesion IC) were revealed for all levels of introduction studied.

These compositions made it possible to achieve remarkably high levels of bonding of starches and of total retention, even with a difficult pulp (old papers) and at relatively high levels of introduction (6 and 8 %). These compositions could thus be advantageously used to improve the physical properties, in particular the internal cohesion of papers obtained and this without risk of large losses of starchy and fibrous materials in the white water."

(see on page 12 lines 24 to 32 ; underline added)

Other remarkable improvements have been obtained according to the invention on papers of the covering type for a corrugated board : see on page 15 of the specification lines 7 to 12 and 19 to 27 :

"These tests confirmed overall the results and

conclusions of the previously described test, particularly in terms of a very significant improvement in internal cohesion and the burst index of the papers obtained.

Moreover, these tests also showed a very significant improvement (i.e. at least 20 %) in the "CMT 30" values obtained on paper of the covering type for a corrugated board.

(...) As a result of this, the use of a composition according to the invention makes it possible to envisage gains in CMT of at least 20 %, and this for all types of papers for corrugated board (covering and fluted).

This is all the more surprising considering that, as the Applicant has found, such gains do not harm the other properties of such papers (porosity, wettability, etc.) nor the subsequent use of such papers in board making. Now, such harmful effects are generally encountered with papers surface treated in a "size press".

This confirms the value of compositions according to the invention within the aim of totally or partially dispensing with devices of the "size press" type. "

Thus there is no hint in any of the prior art documents that "A process for the internal treatment of plane structures, wherein the plane structures are paper, board or films, said process comprising the simultaneous introduction of a composition comprising at least one cationic starchy material and at least one sulfonated starchy material so that such composition is totally or substantially distributed throughout the resulting plane structure" (see claim 83) could be carried out, giving surprising better results than the other known processes. Such a process according to the invention is new and

also inventive versus the cited prior art MALICZYSZYN documents.

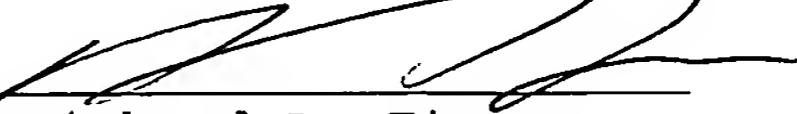
As a conclusion, it is hence respectfully submitted that the objection under 35USC§102(b) be withdrawn and that the Application is now in proper form for allowance.

Respectfully submitted,

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